

# Audio signal separation using BSS techniques

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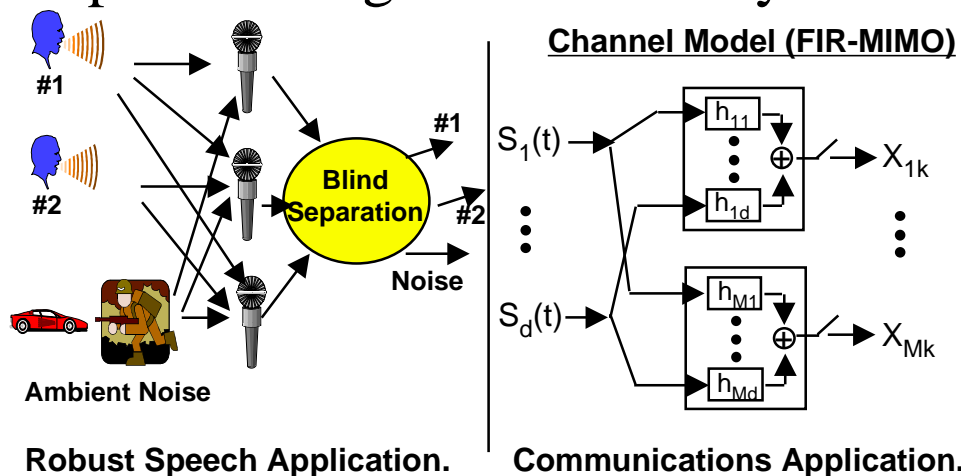
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# Motivation

- Interfering signals
  - affect communication
  - reduce speech recognition accuracy

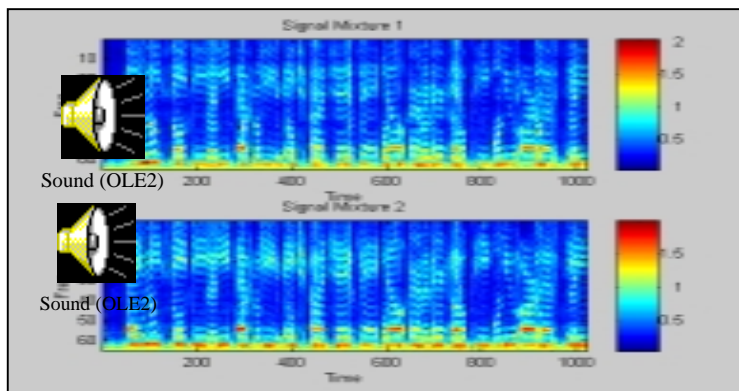


- Goal: robust speech recognition or interference free communication

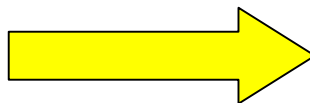
# Blind Signal separation state of the art

- Techniques developed so far are based on:
  - Constant modulus algorithm (CMA), Independent component analysis (ICA), polyspectra and time-frequency
- Example of ICA (Frequency domain - JADE ICA):

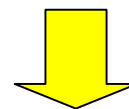
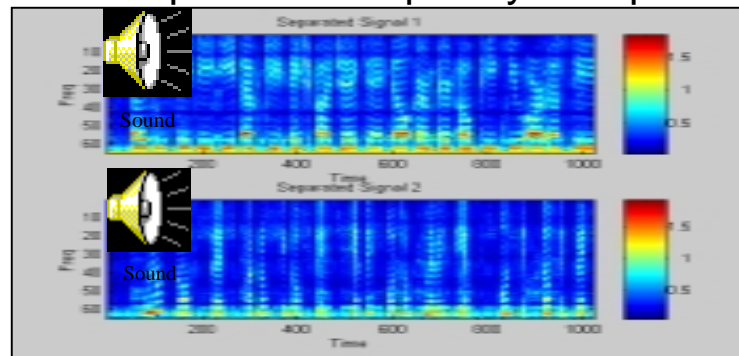
Spectrograms of Speech Signal Mixtures



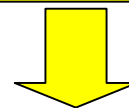
JADE-ICA on  
Each Frequency  
Bin With Port  
Deswapping and  
Normalization



ICA-Separated Frequency Components



Inverse Spectrogram Transform



Separated Speech Signals

↪ Used 16-tap random channel and cross-channel filters and mixing matrix  $\begin{bmatrix} 0.4 & 0.6 \\ 0.6 & 0.4 \end{bmatrix}$

↪  $F_s=8$  khz, spectrogram window size=128